

## ABSTRACT OF THE DISCLOSURE

5 A plasma processing apparatus for processing an  
object to be processed using a plasma. The apparatus  
includes a processing chamber defining a processing  
cavity for containing an object to be processed and a  
process gas therein, a microwave radiating antenna  
having a microwave radiating surface for radiating a  
microwave in order to excite a plasma in the processing  
cavity, and a dielectric body provided so as to be opposed  
10 to the microwave radiating surface, in which the distance  
D between the microwave radiating surface and a surface  
of the dielectric body facing away from the microwave  
radiating surface, which is represented with the  
wavelength of the microwave being a distance unit, is  
15 determined to be in the range satisfying the inequality  
$$0.7 \times n/4 \leq D \leq 1.3 \times n/4 \text{ (n being a natural number).}$$